



1910

The Influence of Physical Features upon the History of Rhode Island

David W. Hoyt A.M.

Follow this and additional works at: <http://helindigitalcommons.org/lawarchive>

 Part of the [History Commons](#), and the [Law Commons](#)

Recommended Citation

Hoyt, David W. A.M., "The Influence of Physical Features upon the History of Rhode Island" (1910). *Library Archive*. Paper 22.
<http://helindigitalcommons.org/lawarchive/22>

This Article is brought to you for free and open access by the HELIN State Law Library at HELIN Digital Commons. It has been accepted for inclusion in Library Archive by an authorized administrator of HELIN Digital Commons. For more information, please contact anne@helininc.org.

RI
974.5
H868
1910
c. 1

RHODE ISLAND STATE LIBRARY

Rhode Island Education Circulars

HISTORICAL SERIES—IV

THE
Influence of Physical Features upon
the History of Rhode Island

By

DAVID W. HOYT, A. M.

PRINCIPAL, ENGLISH HIGH SCHOOL, PROVIDENCE



DEPARTMENT OF EDUCATION
STATE OF RHODE ISLAND

1910

Rhode Island Education Circulars

HISTORICAL SERIES—IV

THE

Influence of Physical Features upon
the History of Rhode Island

By

DAVID W. HOYT, A. M.

PRINCIPAL, ENGLISH HIGH SCHOOL, PROVIDENCE



DEPARTMENT OF EDUCATION

STATE OF RHODE ISLAND

1910



RI
974.5
H868
1910
C.1

NOTE

This paper, in its present form, was prepared for the Rhode Island Historical Society, and was first read at a meeting of that society, Jan. 15, 1907. A few notes and plates have now been added.

The Influence of Physical Features upon the History of Rhode Island.

To affirm that the physical features of the State of Rhode Island have influenced its history is not to deny that the character of its early settlers has exerted an equal, or perhaps a greater influence. It would ill become one who has made a special study of genealogy to ignore the fact that heredity affects the history of a state. If he were inclined to doubt the fact in general, there are too many evidences of that influence in this State to be overlooked. But, at this time, that branch of history is not our topic.

The most prominent physical feature of the State is Narragansett Bay, whose deepest water is as deep as any found in Delaware Bay or Chesapeake Bay, and deeper than in Buzzard's Bay, Vineyard Sound, and the harbors of New York, Boston, New London, and Portland; though Casco Bay has somewhat deeper water. Narragansett Bay, with its islands and "necks," occupies a large part, perhaps one-fifth, of the area of the State. Five of the thirty-eight towns of the State are wholly situated upon islands; and "necks," or peninsulas, form prominent parts of other towns. All the streams of any size in the State, except the Pawcatuck, flow into the Bay. Of these rivers, the Blackstone, Ten Mile, and Taunton drain considerable portions of Massachusetts.

The surface of the land gradually rises from the level of the Bay to the west and north, and the highest hills in the western part of the State are only about 800 feet above tide water.

Next to Narragansett Bay and its tributaries, the changes wrought by the ice invasion of the glacial epoch are of the greatest importance in their influence upon the industries and history of the State. Of this we shall have occasion to speak more fully in later portions of

this paper. The number and size of ponds and swamps are worthy of note in this connection. Waterfalls, bowlders, and hills are important links in the chain of evidence.

Its mineral resources should not be omitted in this survey of the State. The presence of beds of coal, graphite, iron ore, lime-stone, and granite have exerted an influence upon its history.

It should be remembered that the mild southerly breezes from the warmer waters of the Bay, the Sound, and the South Atlantic, so different from the easterly ocean breezes from the colder waters of the Atlantic north of Cape Cod, have affected the climate of Rhode Island and the habits of its people. Moreover, the presence of so large a body of water in the midst of the State tends to produce an equable climate, avoiding both the severe cold of winter and the extreme heat of summer.

One of the most marked peculiarities noticed by a native of Massachusetts who comes into Rhode Island is the absence of ancient cemeteries and the presence of old family burying places. The burial place of Roger Williams and the Williams family burying ground at Roger Williams park are illustrations in Providence. The North Burial Ground was by vote of the town in the year 1700, two generations after the settlement of the town, to be set off from the training ground; but the first interment there is said to have been made some ten years later. We have in mind, however, more especially, the family grounds seen in country towns. The lack of a State church may account, in part, for the absence of the church-yard; but each church might have maintained a burial place for its own members. This feature is only one illustration of the intense individualism of the members of the old families of the State, the "separatism" which is the central theme of Richman's studies of Rhode Island. In the history of the State, the antagonism of town and country is constantly appearing; and it is not, even yet, eliminated from the politics of Rhode Island.

Undoubtedly this individualism or separatism may have resulted in part from the marked characteristics of the early settlers, and the

political character of the state which they founded; but may not the physical features of the State have exerted an equal influence? The islands were isolated from each other and from the main land, and the "necks" had individuality of their own. It required a strenuous man like Roger Williams to row 50 or 60 miles, from Providence to Newport and back, to engage in a controversy on a religious topic.

In an address delivered before the Rhode Island Historical Society, in 1885, President Gammell used the following language in reference to the early settlers: "With the waters of the bay stretching between them, sometimes boisterous, sometimes frozen, and always dangerous, how were they to be brought together in this infancy of their existence? We little appreciate or even imagine, how formidable was the barrier thus interposed in those early days. The passage from the plantations of Aquidneck to those of Providence, even in the most favorable circumstances, required a long day of hard rowing in Indian canoes or in the rude boats which the settlers soon began to build for themselves. The first General Assembly for adopting the charter of 1643 was held in May, 1647, at Portsmouth, then the largest town in the colony. Judge Staples, in his 'Annals,' expresses the opinion that the greater part of the male population of Providence found their way to this Assembly in canoes, rowed by themselves. The instructions given by the town meeting to the special delegates to this Assembly, closed with the following striking words: 'We commit you unto the protection and direction of the Almighty, wishing you a comfortable voyage, a happy success and a safe return unto us again.' Words like these suggest the difficulties and dangers which attended a 'voyage' on the bay, even in the month of May, in the twelfth year after the first settlement had been made."

The General Assembly afterwards accommodated its members by meeting in several different places, and so persistent has been the custom, that the government is only just now settled in one capital.

Block Island is so far from the main land that it has had a peculiar life of its own. Until recent years, it had no close communication

with the rest of the State. In fact, it has not always been considered a part of Rhode Island. Like the Isles of Shoals, it has owed allegiance to different colonies. It belongs to the same terminal moraine as Long Island, and it has been thought that the two islands were formerly connected by a neck of land which the waves and tidal currents have washed away. The water between them is nowhere 100 feet deep.

Fishing was the prominent occupation of the earlier settlers of Newfoundland and portions of the New England coast; but it does not seem to have played so prominent a part in the settlement of Rhode Island, though there was an abundance of coast line. Fish were then caught for food, indeed, but not so much for export. Block Island has been engaged in that occupation to some extent, to be sure, but in this respect it never was like the Isles of Shoals, where large companies of fishermen lived in the 17th century. Perhaps that collection of rocky islands was itself a better fishing ground than the single island of Manisses, a deposit of loose material, dumped where it is by the ice sheet, a portion of the southern, or oldest, glacial terminal moraine. The seaport towns of Rhode Island in later days, even when their ships were found in all waters, never equalled those of Massachusetts, so far as whaling is concerned, and the sacred cod never was enshrined in Rhode Island halls.

In recent years, Providence River oysters and Rhode Island clams have borne an established reputation for excellence, and the State thus derives considerable revenue from its most prominent physical feature, Narragansett Bay, a depression dating back to pre-carboniferous time, but modified, and perhaps deepened, by glacial action. Its fish are utilized for food and oil, and the State is striving to protect its young lobsters and clams, and in other ways to preserve this valuable source of income for the inhabitants of this State.

The earliest settlers of Rhode Island were obliged to support themselves largely by agriculture. They settled along the banks of the streams and on the islands of the Bay, where nature had prepared the ground for them. Roger Williams began his planting before he

crossed the Seekonk River. He said of himself that he must be continually "at the hoe and the oar for bread." The pioneer, William Blackstone, cultivated his fruits near the river which bears his name, and shared them with later comers.

For several generations there were no western cultivated fields from which to draw supplies of food, as at present, and no adequate means of transportation existed, even if those fields had been cultivated. Later generations must push out to the west and north, clear and cultivate new fields, before the next era begins. The natural course of migration in New England was up the streams and later across the country, in many cases following the trails of the Indians, who, long before the white man came, had found the pathways of the streams and portages.

The flood plains of the Mississippi, the Ohio, the Connecticut, and even the Merrimac, have had an important influence on the settlement, the farming and other industries of the states through which these rivers flow; but this feature, though present to some extent, has not had so much influence in connection with the banks of our smaller rivers.

In this connection it may be well to refer to the peculiar agricultural life of the southern part of this State, the Narragansett country, even though that mode of life extended into a later era. There are several physical factors which must be noted, such as the mild southerly breezes to which we have referred, the proximity of such large bodies of water as the Bay and the Sound, which soften the climate and give the advantages of commerce. Moreover, the northern glacial terminal moraine extending through Westerly, Charlestown, South Kingstown, and Narragansett, profoundly changed the physical features of the South county. It obstructed the streams which previously ran southward into the Sound, and caused them to unite in the Pawcatuck and pursue a long westerly course before their waters enter the Sound in Little Narragansett Bay. There are ponds north of this moraine and others south of it; but the two classes of ponds have an entirely distinct origin.

Those on the north, such as Chapman, Watchaug, Worden's, and others, are the result of the obstruction of the drainage by the moraine. The hollows left must fill with water, where there is so much rainfall as in New England. Rivers are permanent, but ponds and lakes are temporary, when natural causes have free play. Sediment is continually carried into the pond. This and vegetable growth are filling it up, while the running water is wearing down the outlet, and draining the pond, if above sea level. It gradually becomes a swamp, and eventually dry land.

The ponds on the south side of the terminal moraine, such as Babcock's, Quonochontaug, Charlestown, Green Hill, and others, have a far different origin. When this part of the continent was somewhat more above sea level than at present, the waters rushing to the Atlantic carved valleys. When the continent sank to the present level, the ocean filled these valleys and they became small, shallow, bays or gulfs. The ocean waves have since washed up sand and made bars, which finally straightened the coast line and made ponds of the bays. These, too, are gradually filling with sediment and vegetable growth, and becoming marshes and swamps; but, as their bottoms are not above sea level, they can not be drained by outlets. The south coast of Long Island, as well as of the State of Rhode Island, is thus becoming straightened; but that of Connecticut retains much of its original irregularity, being protected from the full force of the Atlantic waves by Long Island.

South county is thus a region of mild climate, where hay may be stacked in the fields through the year. A region of streams, glacial hills, boulders, ponds, swamps, marshes, and fertile plains, much of whose fertile soil was brought from the north by the ice and water of the glacial period, and kept there by the terminal moraine, which also caused the accumulation of vegetable mold. The elder Winthrop, writing in 1634, says: "The country on the west of the bay of Narragansett is all champain [flat, open country] for many miles, but very stony and full of Indians." These physical features may have made the Narragansett Indians somewhat different from other tribes.

Soil, scenery, climate, and commercial intercourse played their part after the white man came, in making the Narragansett country a region of large estates, country mansions, slave quarters, lavish hospitality—society with an educated upper class and a southern flavor. Here we find a people with sufficient leisure to breed fast pacing horses; a region of quaint legends and ghost stories, and buried Kidd treasure. Here the Episcopal church early gained a foothold. Christmas was celebrated, and loyalty to the king showed itself in local names, some of which the Revolution did not obliterate. Here and at Newport art flourished and noted portrait painters found their patrons. Here Gilbert Stuart was born. Channing states that he does not find that the ancestors of the Narragansett farmers were superior in birth or breeding to other New England colonists. If that be true, then we must look to physical features of the county for a cause.

The second era in the history of the white man in Rhode Island is that of commerce. This is so manifestly dependent upon the most prominent physical feature of the State, Narragansett Bay and its tributaries, that it has received much attention, especially in Richman's works on Rhode Island, and in the address of Professor Gammell from which we have quoted. It need not, therefore, be here treated at length.

The part that Rhode Island took in the formation of the navy of the United States and in achieving its victories is too well known to need narration here. A mere mention of Talbot, Whipple, Hopkins, and the Decatur and Perrys is sufficient to recall their exploits.

In the merchant marine, Rhode Island was equally prominent. To quote again the language of Gammell: "The bay enabled its people to become a colony in a large degree of sailors and seafarers, of ship builders and merchants." It "trained the feeblest of the New England colonies to become, in some respects, the commercial rival and equal of the strongest." It "bred a race of sturdy and heroic men, the merchant owners and also the masters and crews of ships that had sailed in every sea and brought back the products of every clime."

While Newport, the fashionable summer resort of to-day, faces the open Atlantic, Newport, the second great seaport of the country in the middle of the eighteenth century, faced Narragansett Bay. Its ancient wharves and those of Bristol, Warren, and Wickford, still bear witness to the era of commercial prosperity. The merchants and hardy seamen of these places and of Providence did not hesitate to deal in slaves and rum, as well as in groceries, dry goods, and the products of the Indies. The foundations of the fortunes of many of the old families of the State were laid in this era of commercial prosperity. While Narragansett Bay is still a favorite resort for naval vessels and pleasure yachts, the commercial prominence of Newport disappeared after the Revolution, and that prominence has not reappeared to any great extent, even in Providence.

The third great era in the history of Rhode Island is that of manufactures,—the nineteenth century. The period of transition from commerce to manufactures, the physical causes of the change and its industrial consequences, are well portrayed by Gammell, in a literary style which the present writer can not hope to equal. As he says, “we retired from the salt water to the fresh, from the bay to the rivers. From sending ships to every ocean, we now turned to the building of factories on every stream within our borders.”

The depression now occupied by Narragansett Bay has existed from early geological time, as far back as the carboniferous period, at least, the depression then extending northeasterly into Massachusetts territory. The epoch of manufactures, however, is based upon water-power, and that upon physical features due to a much more recent geological change, as late as the glacial period, probably contemporaneous with the existence of man upon the earth. The presence of ponds and water-falls is accepted as evidence of “youth” in streams, that is, of recent geological changes in their beds. Before the glacial invasion the streams doubtless had well graded beds, without ponds or water-falls. The ice sheet left irregular deposits of bowlders, gravel, sand, and clay in the river valleys, mingled depressions and elevations, thus creating ponds and water-falls. The rivers were often forced to seek new channels, where they met ledges

PLATE I.



RIVER BASINS AND DIVIDES.

All areas between the *heavy* lines drain into Narragansett Bay.

The terminal moraine makes the divide which bounds the Pawcatuck basin on the south.

1. Pawcatuck.
2. Pawtuxet.
3. Woonasquatucket.
4. Moshassuck.
5. Abbott's Run.
6. Ten Mile.
7. Warren, Barrington and Runnins.
8. Blackstone and Seekonk.

and other obstructions, and in that way, also, falls were produced. The ponds furnished reservoirs for storing water to be used during the dry seasons, and the falls furnished the water-power needed for manufactures. Man has supplemented the work of nature by building dams and causeways, thus changing rapids into falls and nature's ponds and swamps into enlarged reservoirs. We have already alluded to the effects produced on the streams in the southern part of the State, compelled to unite in the Pawcatuck, and furnishing some water-power. Let us now turn to other rivers, which furnish greater water-power and on which the growth of the State in the nineteenth century largely depended.

The most extensive river basin lying wholly within the State is that of the Pawtuxet. This water-shed furnishes the supply of water for the city of Providence, and water-power for many mills. The present divides, which separate this basin from that of the Pawcatuck on the south, and from the Woonasquatucket and Blackstone on the north, are very low, and might readily be changed by geological agencies. Geologists point to the numerous ponds and falls as proof that the bed of the river was changed by glacial deposits. It has been suggested that the pre-glacial Pawtuxet entered Narragansett Bay at Apponaug, instead of taking its present long northeast course. There is only one mile of apparently loose material, nowhere as much as eighty feet above the Bay, or sixty above the river, between a bend of the Pawtuxet River and Gorton's Pond, which empties into Narragansett Bay through Apponaug River and Greenwich Bay. From the same bend in the Pawtuxet to its present mouth is about six miles. The manufacturing villages above this bend suggest that its bed may there have been changed, also, in both branches, by glacial action; but it is not easy to trace their pre-glacial courses.*

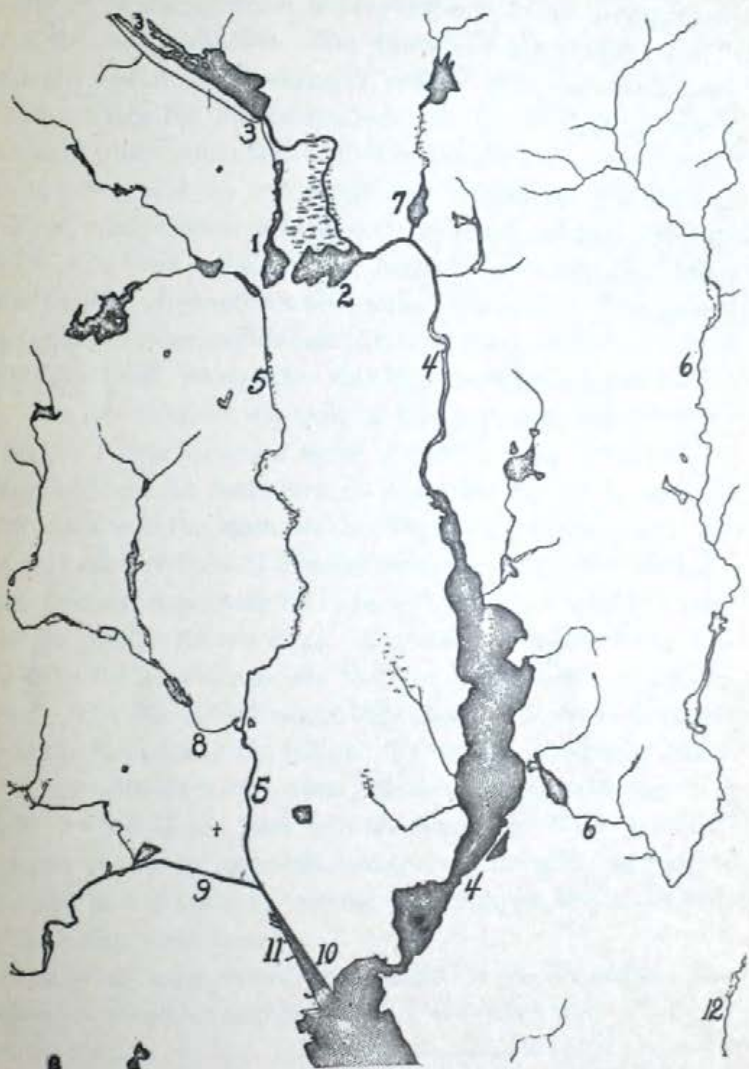
* The Ten-Mile River, which now makes a sharp bend and flows westerly into the Seekonk River, may, in pre-glacial time, have continued to flow southerly, through Runnins River and Barrington River. It has been suggested that the Woonasquatucket River may once have flowed into the Pawtuxet River, through either the present Pocasset River or a valley farther west

The mills of the Woonasquatucket and other streams apparently owe their origin to similar causes; but we turn to the Blackstone River, which more fully illustrates our point. Here we find Pawtucket Falls, Central Falls, Valley Falls, Lonsdale Falls, and others farther up stream. The manufactures of the State have been largely dependent upon this river, and there are many points of interest about it, especially below Lonsdale. We may say that the era of manufactures had its beginning and its largest development here. This stream was the scene of the contest between the canal and the railroad, as means of transportation made necessary by manufactures. Here we have one of the best illustrations of the changes wrought by the glacial period which profoundly affected the history of the State through the development of its industries.

We not only intimate that the falls just named are the result of the changed course of the river, but venture to indicate the probable bed of the pre-glacial Blackstone. It probably ran through Scott's Pond and the valley of the Moshassuck River to the Providence River, and thence to the Bay. The ice sheet left a deposit at Lonsdale, at the north end of the present Scott's Pond, which filled the bed of the Blackstone and compelled the river to flow eastward, where it encountered ledges and produced the falls which man has utilized. From Lonsdale to Pawtucket the present Blackstone is emphatically a "young" stream. There is a fall of 74 feet between the present level of Scott's Pond at Lonsdale and mean tide water.

Scott's Pond presents a strange combination of nature's work and man's work. In the early part of the 19th century, the northern part of the present pond was called Cranberry Pond, with an outlet southward into what was then called Scott's Pond, two feet lower, now the southern part of the present Scott's Pond. This flowed into the Moshassuck River. The era of manufactures demanded better means of transportation between Providence and Worcester, and the Blackstone Canal was built. The charter was granted in 1823, the company was organized and water privileges deeded in 1825 and 1826, and about 1828 water was taken from the Ashton dam "for canal purposes only."

PLATE II.



SCOTT'S POND AND THE BLACKSTONE VALLEYS.

1. Scott's Pond. 2. Valley Falls Pond. 3. Blackstone River and Canal.
4. Post-glacial Blackstone, or Seekonk River. 5. Moshassuck River, or Pre-glacial Blackstone. 6. Ten Mile River. 7. Abbott's Run. 8. West River. 9. Woonasquatucket River. 10. Fox Point. 11. Providence River. 12. Runnins River.

The canal followed the Blackstone River above Lonsdale, where it may still be seen; but it was impracticable to follow it around the various falls to Pawtucket. The direct and convenient route to Providence was by the Moshassuck Valley. Man was simply using the valley which the Blackstone had made for itself in pre-glacial time, but of which it had been robbed by the glacier. There must be locks, however, and the two ponds were utilized for that purpose. The act of incorporation in 1823 gave the canal company the right to use Scott's Pond and Cranberry Pond as "reservoirs and feeders for the purpose of supplying with water said canal." The ice had left an esker, or ridge, on the east of Scott's Pond, separating it from Valley Falls Pond, which esker may have been built higher for the locks. An embankment was built on the south side, and Cranberry and Scott's Ponds became a series of two or three locks, with an opening made on the north into the canal and the Blackstone, and on the south into the Moshassuck. The raising of the level of the water of Cranberry Pond 17 feet was doubtless the cause of lifting the famous floating island with its trees, still to be seen near the north end of the present Scott's Pond. But it was seen that the flow of water from the Blackstone into the Moshassuck must be carefully guarded. The Blackstone might very easily be restored to its old pre-glacial channel, and the mills on the present post-glacial Blackstone be left without water-power. Hence the canal company were required by law to put back into the Blackstone River, from surplus water stored in reservoirs constructed for that purpose, as much water as was taken to pass boats up or down, within one hour from the taking of the same.*

The building, some twenty years later, of the Providence and Worcester Railroad, caused the canal to fall into disuse. The rail-

* The topographical map of Rhode Island, prepared by the United States Geological Survey, and published by this State in 1891, gives the height of Scott's Pond, which draws water from Ashton dam, 74 feet; Valley Falls Pond, separated from Scott's Pond only by the "esker," or ridge, 51 feet; and the Blackstone River above Lonsdale, 63 feet.

road followed approximately the course of the present Blackstone River, and thus gave accommodation to the mills and villages built upon its banks. The General Assembly, about 1848, passed an act by which the canal company were "required and directed to close the outlet from Scott's Pond into the Moshassuck river, so as to prevent any flow or leakage therefrom, and also, in all places from which locks are removed, to fill up the canal, or in some other manner to prevent the escape of the water below its present ordinary level." In 1850, the canal company deeded their rights in Scott's Pond and other reservoirs to the Lonsdale Company. As a result of the legal contest which followed, Saylesville Bleachery is not allowed to use the water of Scott's Pond. By the building of the canal and accompanying legislation, the outlet was reversed. Scott's Pond, the original bed of the pre-glacial Blackstone, flowed into the Moshassuck when the white man came here, but now it flows into the post-glacial Blackstone, and is simply a reservoir for the Lonsdale and other mills, its water standing some 19 feet above its former level.

We have spoken of the numerous falls as evidence that the Blackstone River has changed its course. That the Moshassuck Valley was its former course is indicated by the size and character of that valley. The present area of the Moshassuck basin is too small to give much flow of water, far too little water for the river to carve such a valley for itself. The Blackstone receives the rainfall of a large area, extending into Massachusetts, and might have carved the Moshassuck Valley.

Another argument in favor of the present Moshassuck Valley as the pre-glacial Blackstone bed is the existence of so many good artesian wells at Saylesville and Silver Spring, in that valley. Successful borings for water in this State are found to penetrate pre-glacial valleys, usually beds of pre-glacial streams. These were filled by glacial deposits. First a layer of gravel was deposited on the solid ledge, then above that, other layers of mingled clay, sand, and bowlders. Somewhere to the north, layers of sand or gravel allow the rain-water to reach the gravel lying on the ledge and it very slowly

flows towards the sea, in its pre-glacial bed, but under layers of clay or other impervious material. Sometimes the present stream overlies the pre-glacial bed, as in the Woonasquatucket, near its mouth. At Brown and Sharpe's, the water in the dirty superficial stream is totally unlike the clear water flowing from the gravel of the subterranean stream, in the iron pipe which passes through the overlying impervious strata. Usually, in this State, artesian wells which are bored deep into the solid ledge are failures. This is true of the one of that kind at Saylesville. The numerous successful ones simply reach a valley in the ledge and draw water from the gravel resting upon it.

On old maps a reservoir of water was laid down at the headwaters of the Moshassuck River. The U. S. topographers, in their survey of the State some 20 years ago, reported no such reservoir on their map. A visit to the spot explained the reason. The gate had long been open, verdure covered the former bed, and only a narrow stream trickled through it. The reservoir was no longer necessary, for the artesian wells at Saylesville bleachery supplied all the pure water that was needed. Thus, though the bleachery is not allowed to draw from Scott's Pond and the superficial Blackstone, it apparently does draw from the subterranean Blackstone, flowing slowly along its pre-glacial bed.

May not the empty reservoir and the artesian wells be indicative of future changes? May not future progress depend largely upon this subterranean flow of water, of which we have, as yet, learned so little?

A condition similar to that at Scott's Pond and the Moshassuck Valley seems to prevail south of the terminal moraine, in the southern part of the State. Some of the water which falls in the Pawcatuck basin may run through gravel under that moraine, and reach the ponds and Sound on the south, instead of flowing westward, by way of Westerly. Should an artesian well driven in that region strike a pre-glacial valley, it might yield a plentiful supply of pure water.

A discussion of our general topic would hardly be complete with-

out some further notice of means of transportation. The white man early pushed his settlements up the streams and along the coasts. The bridle paths and roads naturally followed settlements, without mounting high hills. In some cases, these roads followed Indian trails, which also often followed river valleys, though more frequently, perhaps, in other New England states than in Rhode Island, which is more nearly a "peneplain" than any other New England State. Later came the turnpikes, often pursuing a nearly straight line from one prominent town to another, over both hill and valley. Such are the Taunton pike, the Douglas, Hartford, Louisquisset, and others. The railroads reverted once more to the river valleys, because the proper grades could there be obtained, and the manufacturing villages which had there sprung up could thus be reached. A level railway, running in a straight line for a long distance, so easily built in a western prairie region, is impracticable in New England, unless costly tunnels are bored.

The canal as a means of transportation was used but a short time in this State, but present indications point to a greater prominence for canals in the future, out of New England, if not within.*

The comparison between Newport and Providence is an interesting one. While Providence was settled first, Newport soon surpassed it in trade and population. This was evidently the effect of its harbor and proximity to the ocean. But after the Revolution, Providence grew faster than Newport, and soon outstripped its sister capital. The causes for this are mainly physical. The inner harbor of Newport, with the government addition of a breakwater, is safe, but small. It is now often crowded when many yachts assemble there. The outer harbor and the bay to the north have depth of water and plenty of coast line for wharves and docks, but the water is often quite rough in severe storms. Newport and Narragansett Bay could never equal greater New York, with its many miles of shore line on both

* Recently, the Cape Cod canal has been begun, and canals have been proposed from the vicinity of Boston through Taunton River to Narragansett Bay, and thence through the sea-coast ponds along the southern border of this State to Long Island Sound.

sides of North and East rivers, whose width is such that ordinary storms do not endanger shipping.

Newport does not have ready access to a country back of it and around it, to furnish supplies to the city. It has no water-power and is not suited for manufacturing. Fishing and commerce are its only reliable occupations. It has, however, found the use for which nature fitted it, that of a fashionable summer resort. The isolation, and the genial climate of the south part of the State, of which we have spoken, are favorable for this purpose.

Providence differs from Newport in most of these respects. Its roadsteads and wharves are safe from the fury of any ordinary storm. It is situated practically at the head of navigation. To be sure, the Blackstone might be dredged to make Pawtucket the head of navigation, as in the case of the Clyde and Glasgow; but, for our present purpose, Providence and Pawtucket are practically one. Providence thus has the advantage of transportation by water from the ocean, for 25 or 30 miles, which is cheaper than by land; and it thus has the advantage over Newport in communication with the interior of New England. Providence is surrounded by a country from which it can draw labor and agricultural supplies, and to which it can sell manufactured and imported articles, and, in later times, even breadstuffs and fruits brought from the West and South and the isles of the sea. Furthermore, Providence is at or near the junction of several streams; the Blackstone, the Pawtucket, the Ten-Mile, the Woonasquatucket, the Moshassuck, and Abbott's Run. This gives a great advantage to the city thus situated. These streams are all feeders of the city. They furnish water-power for manufacturing, and their valleys are the proper channels of communication by highways and railroads, all converging in Providence. The traveled road connecting New York and Connecticut with Boston naturally passes north of Narragansett Bay, and not across the Bay, further to the south. This, again, would give prominence to Providence.

When the great ice sheet was retreating towards the north, it tarried for a considerable time in this vicinity. But for this, Provi-

dence would not have been what it was when the white man first came here. Mount Pleasant, Prospect, Rocky, and Neutaconkanut hills are pre-glacial, with a ledge for a backbone, but they were smoothed and scratched and marred by the motion of the thick and heavy ice sheet which had passed over them on its way to the south, carried to them, and left upon them, bowlders like the huge one of hornblende rock upon a ledge of granitic rock, the "mica slate" of Jackson's report, on the southern portion of Neutaconkanut Hill. Such a stonewall as that around Dexter Asylum, built of so great a variety of rocks, would be impossible in any unglaciated region. Between and around the hills just named were other hills of loose material, sand plains, valleys, ponds, bowlders, sand, and clay, all the work of the ice and the floods of water resulting from its melting. Perhaps the most important and interesting of these bowlders is one of porphyritic magnetite, uncovered in recent years, near the North Burial Ground, brought by the ice from Iron Mine Hill, in Cumberland, now resting upon a striated and smoothed granitic ledge. This should, by all means, be preserved just where it lies, as an object lesson for future generations.

When the retreating ice sheet tarried at Fort Hill, Field's Point, and Fort Independence, it not only constructed those natural hills which have been used for defence, but it seems to have built a dam there which for a time may have held back the water made by the melting ice, and thus caused the accumulation of the sand plains of South Providence, East Providence, and Seekonk. Later, the rushing water washed away a portion of the dam, making a bed for the Providence River.

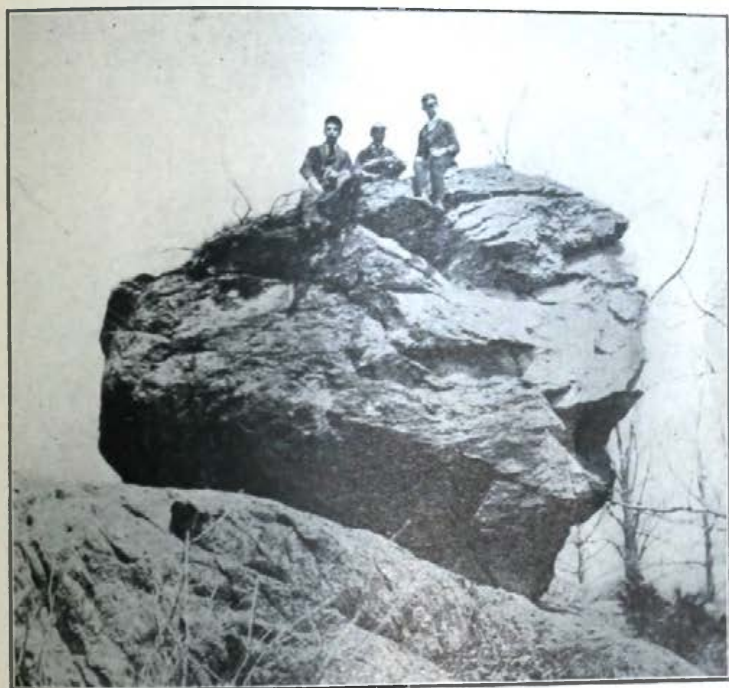
Several of our local names are suggestive of former conditions, some of which have disappeared through man's attempts to modify the face of nature. Our "Prairie Avenues" are suggestive of glacial plains; "Pond Street," of the line of glacial ponds which formerly existed, but of which only a few remain; "Brook Street," of the brook which flowed south till it came to Fox Hill, a glacial deposit of gravel, where it formed a pond and was forced to flow towards the west,

PLATE III.



LEDGE SMOOTHED, SCRATCHED, AND GROOVED BY GLACIER, MOUNT PLEASANT,
PROVIDENCE.

PLATE IV.



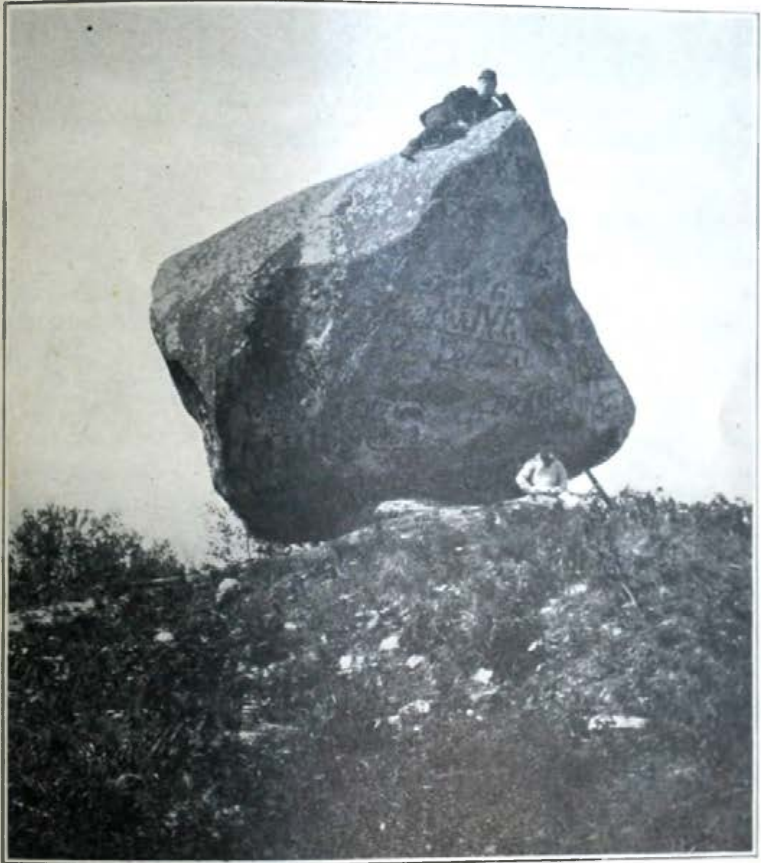
BOWLDER ON NEUTACONKANUT HILL, JOHNSTON.

PLATE V.



BOWLDER NEAR THE NORTH BURIAL GROUND, PROVIDENCE.

PLATE VI.



COBBLE ROCK, NORTH SMITHFIELD, NEAR WOONSOCKET.

and enter Providence River near Fox Point. It will be seen that this case of obstructed drainage duplicates in miniature that of Pawcatuck River and the terminal moraine in the southern part of the State. Both Brook Street pond and "Corky" Hill have disappeared through man's labor and city expense, and the Brook Street sewer now meets no obstruction there. The material of the hill was used to fill low places along the Seekonk River and build the city streets.

Two physical features of the East Side closely connected with the settlement of Providence and its founder, viz., "What Cheer" rock and Roger Williams spring, man has concealed from view, but has lately attempted to mark their location. Weybosset Hill, too, long since disappeared, but may have left its impress upon adjoining streets.

The streets of Providence are somewhat peculiar, and depend, to some extent, upon natural features. They were not laid out, like those of the city of Washington, according to a set plan, ready made in the beginning. They tend to meet at the "great bridge," making a well-defined civic center, which has moved a little towards the west, but still hovers near the water-course. The hill on the east side prevents business moving in that direction, and makes it a region of residences and public institutions, to the banks of the Seekonk River. Whether those banks shall be used for business purposes is a question not yet wholly decided, though Blackstone Park, Butler Hospital and Swan Point seem to have secured much of the western bank above Red bridge, and will preserve its natural beauty.

The center of the city has been so much modified by man that it is hard to imagine its original condition. One natural feature, however, which has now disappeared, the "Cove," has been of great importance in the history of the city. From the time when it was a large body of water, where vessels might be built and floated, till near the present time, it has been a constant cause of discussion and difference of opinion. The final result, however, has been beneficial to the city; for there are now open spaces in the center which could not have been obtained, without great expense, had they been dry land in the beginning, and utilized for building purposes.

The number, size, and distribution of river basins, and the changes wrought in them during the glacial period, have been very important influences in the history of the State, as has already appeared in this paper, to some extent. These basins not only furnish water-power for mills, but water-supply for cities and towns, as in the case of the Pawtuxet, Ten-Mile, Abbott's Run, and others. Sneece Pond, in Cumberland, on the divide between the Blackstone River and Abbott's Run, occupies a peculiar position; and, if we mistake not, has been the occasion for litigation concerning the water supply of Pawtucket and the water power of the Blackstone, the city versus the mills. The situation is something like that of the Two Ocean Creek in the Yellowstone Park, which sometimes flows into the Atlantic through the Mississippi River and the Gulf of Mexico, and sometimes into the Pacific through the Columbia River; but it is unlike it in the fact that the water flows in both directions all the time. One stream would naturally wear down its bed faster than the other, and steal all the water from it, had not man interfered to regulate the flow.

The effect of other natural resources upon the industries of the State, such as the granite of Westerly and other towns, the limestone of Lime Rock and other parts of the State, the coal mines of Valley Falls, Cranston, and Portsmouth, the iron ore found in various places, might be discussed; but enough has been said to show that the history of Rhode Island is, to a great extent, dependent upon its physical features.